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Case report

A Case of Canine Hypodontia in an Early Croatian Cemetery Stranče – Gorica

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A B S T R A C T

In the old Croatian cemetery Stranče – Gorica in the Vinodol region, dating from the 9th to 11th century, osteological parts of the upper and the lower jaws with teeth were found, besides some other archeological finds. Data processing in dentistry regarding a possible presence of hypodontia was carried out on archeological finds (skeletal remains) on 27 persons available for the research. Only one case of canine hypodontia was found and described. In the remaining 26 persons no case of hypodontia was found on the relicts of the upper and lower jaws nor in other teeth groups. The frequency of hypodontia in the old Croatian cemetery Stranče – Gorica was 3.7, which corresponds to the frequency of this anomaly in the 20th century population of Croatia.

Key words: *dental anthropology, canine hypodontia, dental paleopathology, Croatia*

Introduction

Bioarcheology, as an interdisciplinary science must be connected with the related professions, including dentistry, because the study of the past biological systems is an integral part of biological anthropology. The strong representation is driven by the fact that bones and teeth preserve the greatest amount of biologically relevant information about the past, as it was emphasized by Rudan[1] and Larsen[2]. Therefore, studies of earlier human groups will always rely on information gleaned from skeletons for dealing with such issues as physiological stress, nutritional ecology and activity patterns, although other important materials encountered in archeological settings serve as complementary information sources for human remains.

Archeological finds from the Roman times were found in numerous sites in Vinodol, as shown by the researches of Matejčić[3] and Cetinić[4–6], in Selce, Novi, Bribir, Grižane, Crikvenica, Tribalj, Badanj, Bakarac. The research work on the Croatian site in Stranče – Gorica near Crikvenica lasted from 1974 to the last Cetinić[6] research in 1997.

The inventory of archeological finds in the cemetery of the old Croatian necropolis in Stranče – Gorica dates to the period from the 9th to 11th century and contains fossil remains of skeletal and cranial bones with fragments of upper and lower jaws including teeth. The finds also included jewelry, decorative items of attire, objects of everyday use made of ceramics, iron knives and arrows as well as tiny textile remnants[6].

Hypodontia (Agenesio Dentis)

Congenital teeth lack is one of the frequent anomalies of the human stomatognatic system. The lack of one or more teeth since the time when hypodontia in human population was first described by McQuilan (1870) and Lucas (1888) has become the object of numerous studies[7]. Researchers try to reach the heart of etiopathogenetic researches which cause the disappearance of certain teeth or teeth groups.

The English paleontologist Butler[8] set the theory of »developmental field of teeth« related to mammalian teeth. This theory has been applied to human dentition

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by Dahlberg. He considers that in each »developmental field» in a teeth line there is a key tooth which is genetically stable while other teeth at the end of the »field» show lesser stability[9].

The appearance of hypodontia was explained by Bailit[10] by the theory of »developmental field of teeth». He classified the teeth into groups of stable or unstable teeth. According to that theory the upper jaw canines are stable teeth and so are the central incisor, the first premolar and the first molar.

Observing teeth hypodontia separately, wisdom teeth miss frequently and then follow the upper lateral incisors, the lower second premolars, the upper second premolars, the lower central incisors, the upper canines and the lower lateral incisors[11].

Finally, we mention the opinion of dental anthropologists who consider hypodontia a phylogenetic anomaly, because in contemporary humans[12]there is an evolutionary tendency towards jaw reduction.

Case Report

The site of archeological locality, where numerous jaw remains were found as well as this case of canine hypodontia, is located in the Vinodol region in the village Stranče – Gorica (Strančevo selo or Semičevići) next to the road connecting Tribalj and Crikvenica.

The archeological finds of a preserved fragment of the upper jaw with five teeth according to the terrain research protocol originates from grave number 5 and shows that in the left alveolar process there are: a persisting deciduous canine, a lateral incisor, the first and the second premolar and the first molar as permanent teeth (Figure 1).

This finding is confirmed by an X ray of a fragment of the upper jaw remains, where it is evident that in this part of the bone there is no sign of a permanent canine tooth, which points to hypodontia of a permanent tooth. Besides, a rather pneumotized sinus maxillaris, which in its basal part reaches the tips of the second premolar and the first molar's roots as well as the bottom of the nasal cavity can be seen (Figure 2).

At the cemetery of the old Croatian necropolis archeologically examined, there were remains of only 27 persons. Dental analysis established that deciduous and mixed dentition existed in 10 persons, while in the jaws of the remaining 17 persons there were only permanent teeth. A total of 29 jaw fragments (12 upper and 17 lower) was found. The total number of 412 teeth was found in the upper and lower jaws, out of which 358 were permanent and 54 were deciduous teeth. 44 permanent canines were found in 20 persons while 13 deciduous canines were found in 6 persons. In the described relict of the upper jaw one case of permanent canine hypodontia was registered in all bone findings. Therefore, the frequency of hypodontia in this group of examinees dating from the 9th to 11th century amounted to 3.7%. In the remaining 28 osteological jaw fragments, hypodontia of the canines or any other teeth was not registered.

Fig. 1. Fragment of the upper jaw with teeth.

Fig. 2. An X-Ray of a part of the upper jaw with teeth found in the grave.

Discussion

The problem of hypodontia is very complex. It is classified as a genetic abnormality, i.e. anomaly in teeth number, regarding the genesis of one or more teeth[13], which results from an anomalous teeth development in the initial stage[14].

Burzynski and Escobar[15] divide, according to their etiology, all the abnormalities in teeth number into generic and ecological. Each of these categories is further divided into isolated or non- syndrome and syndrome ecological abnormalities. Syndromes, occurring in combination with canine hypodontia, but always with mandibular incisors hypodontia are: Ellis van Creveld's, Hypoglossia-hypodactilia, Lipoid proteinosis (canines and premolars hypodontia), Orofacio-digital I, cleft palate and lip.

According to Schulz[16], hypodontia belongs to oligodontia – a deficiency of genetically stable teeth – which is, just as the aplasia of central permanent incisors, extremely rare. The role of heredity is considered to be very important in the appearance of hypodontia, which is confirmed by a high incidence of hypodontia among relatives[17,18]. Out of nine brothers, Einfeld[19] found three cases of aplasia of one or both upper canines. The aplasia of lower lateral incisors was found in one brother and in another only the aplasia of an upper lateral incisor was found. Hypodontia was not present in their parents. A person with hypodontia as an isolated anomaly can inherit it as an autosomically dominant, X tied, an autosomically recessive or poligenetically determined characteristic[20,21].

The first X-ray-documented publication on hypodontia of all four canines was supplied by Egger[22] in 1924. Along with this hypodontia the upper lateral incisors and the lower central incisors were missing in his examinee.

Weise and Anbuhl[23] provided a review of only eighteen cases with canine aplasia supported by x-ray. In these eighteen cases twenty-eight canines were missing. In their report the researchers showed three new cases of canine aplasia.

The statistical data on teeth hypodontia incidence differ greatly in scientific literature. The differences are due to numerous causes, frequently to a disagreement in sample-taking procedures, as they are most frequently carried out on orthodontics patients[24–27]. The results of hypodontia incidence vary from 2.31 to 5.52%.

For example, Miličić and Čanak[24] mention that in a group of 3.180 examinees there were 75 hypodontia cases (2.35%), while Visković[25] found 114 hypodontia cases (5.52%) in a group of 2066 orthodontic patients. Miličić[28] mentions that permanent canine aplasia is very rare, especially if isolated. The frequency of upper canine aplasia in relation to other permanent teeth is 1.5–1.8%, and the frequency of lower canines is 1%. Upper canine hypodontia is more frequent than lower canine hypodontia[15] and the ratio is 3:1. Caprioglio[29] mentions the frequency of 1% of one canine hypodontia in the upper jaw and of 0.8% in the lower jaw. Hypodontia of both canines in the upper jaw is 0.3% and in the lower jaw it is 0.4%. In his research Miličić[28] mentions four cases of deciduous teeth persistence, arising from aplasia of permanent descendants in two generations. In this finding the genetic factor has played an indirect role, which is confirmed by the researches of Logar[30], Sharawy[31] and Schulz[16]. This result is very similar to our findings and the hypothesis test for two proportions from independent groups shows no statistically significant difference between these two studies (Z=0.458 PROB.=0.3236).

If the data on hypodontia frequency were obtained on a sample of the general population of a certain age and not on selected samples including orthodontics patients as well, the differences would be much greater. The difficulties in obtaining more precise and reliable data can arise from different systems of teeth anomalies classification or from using different diagnostic criteria.

In cases of a teeth number anomaly, the criterion for registration of such conditions should not only be a clinical examination of teeth line for getting certain anamnesis data, but also an x-ray should be done in order to confirm our doubts about teeth lack in the time interval when they are expected to be present in the teeth line of upper and lower jaws.

Our case of upper permanent canine hypodontia presents one case or 3.7% and it was registered in a small group of 27 examinees where jaw and teeth remains were found, so reliable data on hypodontia incidence in the population in the period from the 9th to 11th century cannot be confirmed. Archeological finds date from this period and they were found in the cemetery of an old Croatian necropolis in the region of Vinodol.

As a comparison we mention the data provided by Percač[32], whose study established the main characteristics of human populations in Slovenia from the Roman Times (4th century) and the Slavs (from the 7th to 8th century), but hypodontia was not registered then.

The analyzed anthropological material included a total of 544 jaws (208 upper and 336 lower jaws) and 2 350 teeth. In 75% of cases of the upper jaw only one part of the corpus with a part of palatal and alveolar process of the maxilla was preserved.

Legović's research[26] on the frequency of anomalies in permanent teeth in 2401 examinees for the region of Istria shows a significantly lower incidence of canine hypodontia (1.3%). In males no case was registered, contrary to our archeological finds which amount to 3.7%.

However, Visković[25] established a lower and an upper hypodontia incidence of 3.86% on a sample of 2066 orthodontics patients aged 8–20, which corresponds to our results (3.7%) for the Croatian population in the Vinodol region in the period from the 9th to 11th century. A hypothesis test for two proportions from independent groups shows no statistically significant difference between these two studies (Z = –0.411 PROB. = 0.3405). But, we should also mention the opinion of Škrinjarić[8] who emphasizes that hypodontia incidence, which is considered a genotype characteristic of a certain population, can vary with different populations.

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SLUČAJ HIPODONCIJE GORNJEG TRAJNOG OČNJAKA U STAROHRVATSKOM GROBLJU STRANČE – GORICA

U starohrvatskom groblju Stranče – Gorica kraj Vinodola koje datira između 9.–11. stoljeća, pronađeni su pored ostalih arheoloških nalaza i osteološki dijelovi gornjih i donjih čeljusti s zubima. tomatološka obrada podataka o mogućoj pojavi hipodoncije izvršena je kod arheoloških (skeletnih ostataka) nalaza u 27 osoba koje su bile dostupne za istraživanje. Pronađen je i opisan samo jedan slučaj hipodoncije gornjeg trajnog očnjaka. Kod preostalih 26 osoba iz uzorka na reliktima gornje i donje čeljusti u alveolarnim nastavcima nije pronađen niti jedan slučaj hipodoncije niti kod drugih skupina zubi. Učestalost hipodoncije u starohrvatskom groblju Stranče–Gorica iznosila je 3.7% što se podudara s podacima o učestalosti ove anomalije u populaciji 20. stoljeća u Hrvatskoj.